



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/696,438

10/29/2003

Hong-Seong Son

8028-29

6816

7590

08/31/2004

(SPX200211-0050US

EXAMINER

LEBENTRITT, MICHAEL

Frank Chau

F. CHAU & ASSOCIATES, LLP

Suite 501

1900 Hempstead Turnpike

East Meadow, NY 11554

ART UNIT

PAPER NUMBER

2824

DATE MAILED: 08/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/696,438

Applicant(s)

SON ET AL.

Examiner

Michael S. Lebentritt

Art Unit

2824

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 October 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/21/03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 10/29/2003 was filed before the mailing date of the first action on the merits. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adler et al, US Patent 6,452,779 and further in view of Applicant's Admitted Prior Art (AAPA):

Adler discloses forming an interconnection line (104), wherein the interconnection line functions as a first electrode; forming a first insulating layer (103) on the substrate and the interconnection line (figure 5a); forming an electrode layer (102) and an oxide layer (101) on the first insulating layer; etching the oxide layer and the electrode layer to form second electrode and an oxide layer pattern (figure 5b).

Adler is applied supra but lacks the anticipation of forming a photoresist pattern on the oxide layer; wherein at least the electrode layer is wet etched; and removing the photoresist pattern. AAPA discloses forming a photoresist pattern (23); wherein at least

Art Unit: 2824

the electrode layer is wet etched (page 3, lines 15-20); and removing the photoresist pattern (page 4, lines 1-4). In view of this disclosure it would have been obvious to one of ordinary skill in the art at the time of invention to form a photoresist pattern, wherein at least the electrode³ layer is wet etched; and removing the photoresist pattern as taught by AAPA, in view of the primary reference of Adler, because these steps are conventional in the art in the formation of MIM capacitors.

In regards to claims 2-5, and 16; Adler is applied *supra* but lacks the anticipation of wherein the step of forming the interconnection line comprises: forming a second insulating layer on the substrate; and forming a pattern in the second insulating layer using a damascene technique and wherein the pattern is formed from a copper layer. Adler discloses wherein the dielectric layer is formed of one of a silicon nitride layer, a silicon carbide layer, a silicon oxycarbide layer and a silicon carbonitride layer. AAPA discloses wherein the step of forming the interconnection line comprises: forming a second insulating layer on the substrate; and forming a pattern in the second insulating layer using a damascene technique and wherein the pattern is formed from a copper layer. In view of this disclosure it would have been obvious to one of ordinary skill in the art at the time of invention to wherein the step of forming the interconnection line comprises: forming a second insulating layer on the substrate; and forming a pattern in the second insulating layer using a damascene technique and wherein the pattern is formed from a copper layer as taught by AAPA, in view of the primary reference of Adler, because these process steps are conventional in a damascene technique.

Claims 6,8,10-12,14,15,17,20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adler et al and AAPA as applied to claims 1-5 and 13 above, and further in view of Adler et al, US Patent 6,259,128.

Adler and AAPA are applied supra but lacks the anticipation of wherein the electrode layer is formed of one of a tantalum layer, a tantalum nitride layer, a titanium layer and a titanium nitride layer; wherein the electrode layer is formed of one of a tungsten; layer and a tungsten nitride layer; using the photoresist pattern as an etching mask; wherein the electrode layer is formed from metal and wherein the interconnection lien is formed from metal. Adler discloses wherein the electrode layer is formed of one of a tantalum layer, a tantalum nitride layer, a titanium layer and a titanium nitride layer; wherein the electrode layer is formed of one of a tungsten; layer and a tungsten nitride layer; using the photoresist pattern as an etching mask; wherein the electrode layer is formed from metal and wherein the interconnection lien is formed from metal. See column 2, lines 30 to column 4, line 30. In view of this disclosure it would have been obvious to one of ordinary skill in the art at the time of invention to wherein the electrode layer is formed of one of a tantalum layer, a tantalum nitride layer, a titanium layer and a titanium nitride layer; wherein the electrode layer is formed of one of a tungsten; layer and a tungsten nitride layer; using the photoresist pattern as an etching mask; wherein the electrode layer is formed from metal and wherein the interconnection lien is formed from metal as taught by Adler, in view of the primary reference of Adler, because the materials selected are conventional in MIM capacitor fabrication and readily substituted.

Claim 7,10,18,19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adler et al and AAPA as applied to claims 1-5 and 13 above, and further in view of Cogan, US Patent 4,497,107.

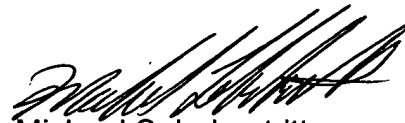
Adler and AAPA are applied supra but lacks the anticipation of wherein etching is performed using a mixture of hydrofluoric acid and nitric acid; and wherein the electrode layer is wet etched using hydrogen peroxide. AAPA discloses wet etching using hydrofluoric acid. Examiner takes official notice that it is well known in the art to wet etch using hydrogen peroxide. Cogan discloses etching using an etching mix of hydrofluoric acid and nitric acid. See column 3, line 3 to 14 and figure 3. In view of this disclosure it would have been obvious to one of ordinary skill in the art at the time of invention to etch using at mixture of hydrofluoric acid and nitric acid as taught by Cogan, in view of the primary reference of Adler, because nitric acid is a well known additive to hydrofluoric acid in wet etching applications.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Lebentritt whose telephone number is 571-272-1873. The examiner can normally be reached on 5/4/9.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael S. Lebentritt
Primary Examiner
Art Unit 2824
